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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,364

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Jin-Suk Lee

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TIPS GROUP

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EXAMINER

CUTLIFF, YATE KAI RENE

ART UNIT

PAPER NUMBER

1621

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/551,364	Applicant(s) LEE ET AL.	
	Examiner YATE' K. CUTLIFF	Art Unit 1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11, 12 & 14 - 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11, 12 & 14 - 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. Claims 11, 12 and 14 - 21 are pending.
Claims 1 – 10, 13 and 22 – 34 have been canceled
Claims 11, 12 and 14 – 21 are rejected.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 14, 2009 has been entered.

Response to Arguments

3. Applicant's arguments, see page 5, filed October 14, 2009, with respect to the 35 USC 112 second paragraph rejection of claim 22 have been fully considered and are persuasive, in view of the cancellation of the claim. The 35 USC 112 second paragraph rejection of claim 22 has been withdrawn.
4. Applicant's arguments, see page 5, filed October 14, 2009, with respect to the 35 USC 103(a) rejection of claims 1 and 3 - 10 have been fully considered and are persuasive, in view of the cancellation of the claim. The 35 USC 103(a) rejections of claims and 3 - 10 have been withdrawn.

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5. Applicant's arguments with respect to claims 11, 12 and 14 - 15 have been considered but are moot in view of the new ground(s) of rejection, based on the claim amendment.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 11, 12 and 14 – 21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The MPEP states that the proscription against the introduction of new matter in a patent application (35 U.S.C. 132 and 251) serves to prevent an applicant from adding information that goes beyond the subject matter originally filed. See *In re Rasmussen*, 650 F.2d 1212, 1214, 211 USPQ 323, 326 (CCPA 1981). Further, that the written description requirement prevents an applicant from claiming subject matter that was not adequately described in the specification as filed. New or amended claims which introduce elements or limitations which are not supported by the as-filed disclosure violate the written description requirement. See, e.g., *In re Lukach*, 442 F.2d 967, 169 USPQ 795 (CCPA 1971) (subgenus range was not supported by generic disclosure and specific example within the subgenus range); *In re Smith*, 458 F.2d 1389, 1395, 173

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USPQ 679, 683 (CCPA 1972) (a subgenus is not necessarily described by a genus encompassing it and a species upon which it reads). The fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed. See, e.g., *Vas-Cath, Inc.*, 935 F.2d at 1563-64, 19 USPQ2d at 1117.

Claim 11 lines 5 and 7 make reference to "crude alkyl ester".

Examiner can not find support for this limitation in the body of the originally filed Application.

Claim 11 contains the negative proviso "without separating the alkyl ester from the reaction product"; in lines 9 – 10.

Examiner can not find support for this limitation in the body of the originally filed Application. Further, any negative limitation or exclusionary proviso must have basis in the original disclosure. (MPEP 2173.05(i)).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 11, 12 and 14 – 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lever Brothers & Unilever Limited (GB 612,667) (Lever), in view of Sucher & Holzer Bauplan Handel (AT 406870B) (Sucher), in view of Peter et al. (WO 03/004591; US 6,933,398), and further in view of Peterson et al. (JAOCS, Vol. 61, 1984).

12. The rejected claims cover, inter alia, a method of producing a bio-diesel oil, comprising: (a) pre-esterifying a free fatty acid, contained in oil/fat, with an alcohol in the presence of an acidic catalyst to create a reaction mixture comprising an alkyl ester; and (b) transesterifying the reaction mixture to create a crude alkyl ester, wherein the crude alkyl ester produced by the step (b) is directly refluxed to the reaction mixture of step (a) and/or step (b) without separating the alkyl ester from the reaction product. The

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dependent claims disclose the type of fat or oil used as feed stock, the type of alcohol, the ratio of alcohol to oil, the catalyst type and the type of reactor.

13. Lever discloses a two step process for the alcoholysis of low grad fatty materials, which includes a pre-esterification step and a transesterification step. The pre-esterification step takes a fatty stock and reacts the free fatty acids therein with a stoichiometric excess of lower alcohol under acidic conditions, in the presence of an acid alcoholysis catalyst; then continuing the alcoholysis (transesterification) reaction under alkaline conditions in the presence of an alkaline alcoholysis catalyst. (see page 2, col. 1, lines 47 - 58). It is stated that an important factor in their process is that a very high conversion can be obtained with the acid catalysis then alkaline catalysis of the whole reaction mass without intermediate removal of the esters. (see page 2, col. 2, lines 104 - 114). The process of Lever uses homogeneous acid catalyst such as, sulphuric, phosphoric, hydrochloric, toluene sulphonic acid and metallic salts. The acid catalysts are used in an amount equivalent to about 0.3 to 1.0% sulphuric acid. (see page 3, col. 1, lines 55-65). The homogeneous base catalyst that may be used include alkali metal compound such as potassium carbonate. (see example 2). The base catalyst is used at a concentration from about 0.1 to 1.0% calculate as the hydroxide. (see page 3, col. 2 lines 74 - 76). The process uses lower alkyl alcohols that contain one, two, or three carbon atoms. (see page 3, col. 1, lines 51-53). The low grade fatty material used may be render's tallow and grease. (see page 1, col. 1, lines 16 - 19). The fatty material to alcohol ratio used by Lever is 1.0 equivalents to about 10.0 equivalents lower alkyl alcohol per equivalent of total fatty acid in the fatty stock. (see

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page 3, col. 1 lines 47 - 50). Lastly, the process of Lever may be conducted in a batch or continuous process. (see page 5, col. 1, lines 43 - 44).

14. The difference between Applicant's claimed process and Lever is as follows: directly refluxing the crude alkyl ester product of step (b) (transesterification product) back into step (a) and/or step (b); adding alkyl ester as a product reactant; the amount of the crude alkyl ester being added as reactant to steps (a) and/or (b); the use of an acid catalyst in step (b); the use of a heterogeneous catalyst as the acid or base catalyst for steps (a) and/or (b); and the various reactor types.

15. However, with regard to the use of directly refluxing the crude alkyl ester product of step (b) (transesterification product) back into step (a) and/or step (b), and adding alkyl ester as a product reactant; the Examiner turned to the teaching of Surcher. The Surcher reference discloses a process for producing a fatty acid alkyl ester by transesterification of triglycerides with an alcohol in the presence of a basic catalyst and is characterized by a combination of the following steps: (1) the triglyceride is mixed with the alcohol and catalyst and converted to form two fluid phases, namely, a crude ester phase and a glycerin phase; (2) the two fluid phases are separated; (3) the crude ester phase is divided into two portions (A) and (B); (4) portion (A) is purified, producing substantially pure fatty acid alkyl ester; (5) portion (B) is mixed with more triglyceride for transesterification, more alcohol and more catalyst and converted to form two further fluid phases, namely, a crude ester phase and a glycerin phase; steps (2) - (5) are then repeated. (abstract). The catalyst used in Surcher is a homogeneous catalyst which can be basic or acidic (page 2, para. 7); the oil/fat can be selected from a vegetable oil or

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animal fat; the alcohols can be methanol or ethanol, and the process can be continuous. (see English translation (Eng. Trans) pages 2 & 3). Additionally, according to Sucher the reaction product, crude ester portion (B), when recycled back into the transesterification phase, the amount of alcohol and catalyst are lowered by enrichment of the reaction with the reaction product crude ester (B). (see ENG. Trans. page 3, para. 5). Further, the last two paragraphs on page 3 of the Eng. Trans. discuss the benefits of recycling a portion of reaction produce crude ester (B) back into the transesterification process that is continuous.

Applicant's claimed general process steps (a) and (b) are taught by Lever. It would have been obvious to one of ordinary skill in the art at the time of Applicants claimed process to modify the teachings Lever as suggested by Surcher, which is to use the alkyl ester produced by the transesterification reaction and recycle it back into the reaction. Further, recycling the alkyl ester product to the pre-esterification stage would have been an obvious modification based on the successful results of Sucher and the fact that the alcohols used in both the esterification reaction and the transesterification reaction are monoalcohols, which by the teaching of Peter are readily soluble in the methyl esters. (see Peter, col. 2, lines 3 – 7).

The motivation to combine may be implicit and may be found in the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved. Also, "an implicit motivation to combine exists not only when a suggestion may be gleaned from the prior art as a whole, but when the improvement' is technology-independent and the combination of references results in a product or process that is

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more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient. Because the desire to enhance commercial opportunities by improving a product or process is universal-and even common-sensical, we have held that there exists in these situations a motivation to combine prior art references even absent any hint of suggestion in the references themselves. (DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co., 464 F.3d 1356, 1366, 1368; 80 USPQ2d 1641, 1649, 1651 (Fed. Cir. 2006).)

Therefore, based on the teachings set out in the Lever, Sucher, and Peter references, the invention as a whole was *prima facie* obvious because a person of ordinary skill in the art at the time the invention was made, would have been motivated to combine the prior art to achieve the claimed invention and that there would have been a reasonable expectation of success.

16. With regard to the amount of the crude alkyl ester being added as reactant to steps (a) and/or (b), the Examiner turns to the teaching of Peter. The process of Peter et al. uses alkanol fatty acid esters such as, methyl esters, ethyl esters and/or propanol esters, before, during or at the same time as addition of alcohol in the reaction process to accelerate the transesterification reaction, which is caused by the formation of a one phase reaction mixture. (see col. 2, lines 33 – 38 & 50 - 54). The alkyl esters of Peter et al. are added in a quantity of 5 to 50 wt.% based on the fat and/or oil. (see col. 3, lines 19-21). Specifically, the alcoholysis process of Peter et al., is carried out by using methanol, and adding a portion of the continuously produced ethyl esters to the triacylglyceride starting product in quantities such that the mixture of oil methanol and

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methyl esters consist of one reaction phase. (see col., 2, lines 60-64). Thus, the amounts of crude alkyl esters being added to the reactions of step (a) or (b), limitations are deemed to be obvious absent a showing of unexpected results.

A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill in the art might reasonably infer from the teachings. (*In re Opprecht* 12 USPQ 2d 1235, 1236 (Fed Cir. 1989); *In re Bode* 193 USPQ 12 (CCPA) 1976). In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35USC 103(a). From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

17. With regards to the use of a heterogeneous catalyst as the acid or base catalyst for steps (a) and/or (b), the Examiner turns to the teaching of Peterson et al. The Peterson reference discloses that heterogeneous catalyst such as set out in Table II with catalyst activity set out in Table III. The reaction process used catalyst concentrations of 0.3-0.5% based on the weight of the vegetable oil. (see page 1593, col. 2, first full paragraph). Peterson et al. teaches the use of heterogeneous catalyst in a transesterification process for the production of diesel fuel. Thus, this limitation is deemed to be obvious absent a showing of unexpected results.

A reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill in the art might reasonably infer from the teachings. (*In re Opprecht* 12 USPQ 2d 1235, 1236 (Fed Cir. 1989); *In re Bode* 193 USPQ 12 (CCPA) 1976).

18. With regard to the use of a plug flow reactor, and arrangement of the reactors, each of these features is an old element common to the industrial esterification and transesterification processes. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to prepare a biodiesel as suggested by Lever with modification of the process as suggested by Sucher in view of Peter et al. and further in view of Peterson et al. to produce a bio-diesel oil, using a plug flow reactor or arrangement of the reactors based on the process being a continuous process. Therefore, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. *KSR International Co. v. Teleflex Inc.*, 550 U.S., 82 USPQ2d 1385 (U.S. 2007).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YATE' K. CUTLIFF whose telephone number is (571)272-9067. The examiner can normally be reached on M-TH 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel M. Sullivan can be reached on (571) 272 - 0779. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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